

Analysis of the Integration of Skill Standards into Community College Curriculum

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The utilization of skill standards in the curriculum development process has become an increasingly prominent aspect of the reform movement in career and technical education (CTE) over the past 10 years. Data were collected across 10 CTE program areas from a nationally representative sample of community colleges. The authors discuss the extent to which industry-based skills standards are being implemented in community college CTE curricula.

Keywords: Career and Technical Education, Skill Standards, Community Colleges

Industry-based skill standards are seen by many as the answer for empowering individuals entering or returning to the workforce while positioning business and industry to regain a competitive edge in a changing marketplace. According to the former National Skill Standards Board (NSSB) website (www.nssb.org), "skill standards identify what people need to know and be able to do to successfully perform work-related functions within an industry sector. Specifically, standards define the work to be performed, how well the work must be done, and the level of knowledge and skill required." Skill standards, therefore, as used in this study, refer to worker performance specifications that have been developed or are being developed by business and industry-based organizations, educational organizations, individual states, or a combination of those.

Skill standards consist of two components: (1) a description of the responsibilities needed for competent performance, and (2) a description of knowledge and skills necessary to carry out these responsibilities (National Skill Standards Board, 2000). In educational settings, skill standards define a facet of student performance that is measurable, and built on the skills learned as students progress through the educational system and into the workplace (Rahn, O'Driscoll, & Hudecki, 1999). In industrial settings, skill standards help those involved prepare for changes in both work and the economy (Wills, 1995).

Standards function as a quality-warranty, a goal-indicator, and a change-promoter (Silvan, 1993). In the context of education, standards clarify expectations for student performance (Rahn, O'Driscoll, & Hudecki, 1999). According to Silvan (1993), the greatest implication of skill standards has been the evaluation of student performance. Advocates believe that skill standards have the potential to (1) improve the U.S. workforce, (2) provide uniform standards for the international marketplace to use as measures, (3) provide portability of employment for U.S. workers, (4) increase accountability, and (5) meet the needs of business and industry (Bunn & Stewart, 1998).

Skill standards have emerged from a belief that technology and market shifts have caused major changes in the skills and behaviors needed by the workforce (Bailey & Merritt, 1995). In 1997, the Center for Occupational Research and Development (CORD) identified several issues accelerating evolution in the workplace, including "(a) rapid advances in technology and their uses by business and industry, (b) the globalization of markets and emergence of internationally competitive workforces, (c) the emergence of high-performance companies, (d) the development of national and international skill standards, and (e) the occupational classification system" (p. 1). These occurrences have led to broad reform within education, involving changes not only in pedagogy and curriculum but also in closer alignment to the needs of the workplace. Changes in the workforce and economy have affected both employer and employee commitment to skill development, as those preparing to enter the workforce now need to prepare for emerging technologies and the possibility of multiple career changes over the course of their working lifespan. Likewise, employers are finding that a better understanding of workplace skills supports potential employees' preparation for the necessary changes in requirements (Wills, 1995). Industry-based skill standards have become a critical component of educational reform. According to Bailey and Merritt (1995), this reform movement has been in response to a growing need for an educational system that (1) meets the needs of learners, workers, and employers; (2) facilitates transitions from school-to-work; and (3) strengthens the economic position of the U.S.

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Existing Empirical Evidence

While the implementation of national skill standards has promised much, there has been little research on the process or outcomes of such implementation (Hoachlander & Rahn, 1994; Raynor & Hudson, 1995). Several studies show that the use of skill standards varies from state to state, but there is limited evidence about CTE faculty knowledge of skill standards and their attitudes toward them.

One study, by the Institute for Educational Leadership (IEL), investigated the skill standards development and use in the U.S. (Wills, 1993). The report indicated that most states used skill standards for curriculum development, program/course guidelines, course syllabi development, and assessment of skill acquisition. It also indicated that more than half of all states used skill standards to certify program mastery. However, the study also found that only about one-third of all states used the skill standards for assessment of student mastery. The development and use of the skill standards was limited to the state level rather than national level.

Belcher and McCaslin (1997) surveyed Ohio secondary school vocational teachers' knowledge of, and attitudes toward, the national skill standards. A little more than one-third (35%) of the teachers surveyed were familiar with the skill standards for their vocational program. The researchers found that slightly over half of the teachers believed that national skill standards would help school-to-work transition, measure individual ability, workforce productivity, and reduce employers' recruiting costs. In addition, about 40% of the teachers believed that national skill standards would help enhance vocational education programs. Finally, 70% of the teachers reported they used employability skills for student ability assessment for the areas in which they taught. While this study explored expectations, it did not examine actual outcomes.

The Role of the Community College in Skill Standards Implementation

Career and technical education (formerly known as vocational-technical education) has been a part of the mission of the community college since its inception. According to Cohen and Brawer (2003) vocational-technical education has been a component of most states' curriculum plans from the earliest days. Vocational education in the community college was designed to teach more complicated skills compared to vocational classes taught in the high school with the intention of "serving students by preparing them for employment and serving industries by supplying them with trained workers" (Cohen & Brawer, 2003, p. 233). College personnel work with employers to analyze local employment trends and design programs of study.

Carter (2000) reported that the technical complexity in the workplace will rise, which means that people who fill the jobs will be required to have specialized, current skills. U.S. employers are no longer looking for applicants who simply have computer knowledge but seek individuals who have specific skills for a specialized field of work. Degrees are becoming less important to many areas of work with specialized skills coming to the forefront. Community colleges are challenged to examine their programs and determine if these programs are capable of this type of professional development. If not, the colleges must decide what is necessary for students to learn and overhaul programs to deliver the required outcomes. Course development becomes critical and the time to do that is shortened.

With the increasing importance of national skill standards and student certification, institutions have to focus on a building a reputation that reflects success in developing students for relevant jobs (Boesel et al., 1994). Current and future students would then be able to make educational choices based on the performance of an institution and the placement of graduates. These placement rates, in turn, serve as clear indicators of successful CTE programs.

Problem Statement and Purpose

Skill standards are not new to education reform. Many groups (e.g., occupational groups, educational agencies, and local schools) have been approaching the task of developing skill standards. However, as Sherman commented, "If everyone thinks their state program is good enough, there will be no portability across state lines. You need national standards to level the playing field" (quoted in Dykman, 1996, p. 30). To develop consistency among skill standards, voluntary nationwide skill standards across career areas have been developed (Stern, Bailey, & Merritt, 1996). These have a chance for national acceptance and portability within the United States and may be of interest to community college faculty. Current literature available on skill standards, however, describes the initial development of skill standards, along with discussion of their purpose as evolving (Dykman, 1996; Rahn, O'Driscoll, & Hudecki, 1999). Much of the information available is intended for secondary rather than postsecondary CTE.

The utilization of skill standards in the curriculum development process has become an increasingly prominent aspect of the reform movement in career and technical education over the past 10 years. Standards are widely seen as a way to achieve better accountability within CTE systems, improving their quality as well as their alignment with workplace requirements. While they are increasingly in use in both secondary and postsecondary CTE programs, little research has been conducted regarding the extent to which they are currently used by community colleges as a key component of curriculum development, delivery, and assessment. If policy makers, education leaders, and CTE community college faculty are to make informed decisions about the best approaches to use in the integration of skill standards into CTE programs, more information is needed about current practice. The purpose of this study was to examine the extent to which various industry- and state-based skill standards are integrated into CTE community college curricula. This study was guided by the following research question.

1. To what extent have industry-based skill standards become part of the community college CTE curricula?

Method

Design and Participants

This study utilized a descriptive survey design to analyze the status of industry-based skill standards implementation in postsecondary CTE programs. A nationally represented sample of community colleges was asked to participate in the research to answer questions addressing the prevalence of skill standards in postsecondary CTE.

The target population for this study was defined as postsecondary colleges and technical institutes that are members of the American Association of Community Colleges (AACC). The sampling frame for the population was obtained from AACC, and contained a list of 1,019 member institutions. After removing duplicate references in the database, the final target population contained 1,015 member institutions.

Cochran's (1977) sample size formula was used to determine the delivered sample size needed to make estimates on skill standards from the target population of 1,015 community institutions. To determine the delivered sample size needed, alpha was set at .05, acceptable margin of error was set at 5%, and variance was conservatively estimated at .25. The required delivered sample ($n = 384$) was then adjusted for exceeding 5% of the target population (Cochran, 1977). The desired delivered sample for the project was 285 after the adjustment. Adjusting for a response rate of just over 50%, the drawn sample included 552 community colleges. The number of institutions selected from each state represented the overall total proportion of community colleges in each state within the U.S.

Instrumentation

A thorough review of the literature on national industry-based skill standards implementation within CTE program areas was conducted. Additionally, community college CTE curricula were reviewed to establish specific skill standards for program areas. Based on these two inquiries, a comprehensive list of 64 industry-based skill standards was created. These 64 standards cover 11 program areas including agriculture; automotive; construction/trade; commercial mechanic and commercial driver's license; family and consumer sciences; graphic arts; health occupations; hospitality and hotel management; manufacturing; industrial; and business, administrative, and information technology. The questionnaire was organized around each of the 11 CTE program areas and their applicable skill standards. However, due to the overlap in skill standards, the program areas of automotive and commercial mechanic were collapsed into a single category resulting in 10 CTE program areas addressed by the survey. For each of the 64 standards, four questions were asked. The four items on the questionnaire were around the following five categories: skill standard awareness, implementation of skill standard, approaches to implementation,

Procedure

A four-round data collection process based on Dillman's (1978) Total Design Method was used to obtain responses to the questionnaire. Questionnaires were coded and logged into a computerized database to track responses. In round one (the initial mailing), a questionnaire was sent to the career and technical deans of the 552 institutions in the sample. Round two involved a postcard mailing to career and technical deans at those institutions that had not responded to the round one solicitation. Round three involved a second mailing of the questionnaire to those individuals who had not responded to the first two solicitations. Round four utilized email and phone contact. The multiple rounds of data collection were designed to increase the response rate. They also allowed for a comparison of the responses from early and late respondents. Each of the data collection rounds is described in greater detail below. Of the 552 institutions surveyed, 204 returned surveys resulting in a 37% response rate. The response rate on this survey compared favorably with a study conducted by AACC. AACC sent their questionnaire

to chief academic officers at more than 1,100 community colleges, and 205 responded, for a 19% response rate (Nock & Shults, 2001).

Data Analysis

The current status of national industry-based skill standards integration into CTE programs was assessed by measuring the characteristics of a nationally representative sample of community colleges at one point in time. Prespecified variables were used to describe prevalence, or frequencies, as well as the various ways in which industry-based skill standards impact community college curricula. In accordance with the research questions, the examined variables reflect the extent to which industry-based skill standards have become integrated into the community college CTE curricula, assessment processes, and diplomas, credentials, and certificates.

Groupings were used to organize the data and to describe the differences in characteristics among the sampled colleges. Grouping included consolidation of the colleges by region, locale and by student enrollment figures, hereafter referred to as institution size. These are similar groups to those used by AACC for their analysis of community college data. Groupings by college region included three groups: (1) East – comprised of the New England, Mid-East, and Southeast states, (2) Midwest – comprised of the Great Lakes and Plains states, and (3) West – comprised of the Southwest, Rocky Mountain, and Far West states. Groupings by college locale also included three groups: (1) urban – comprised of large- ($\geq 250,000$) and mid-size ($< 250,000$) cities, (2) suburban and large town – comprised of fringes of large cities as well as fringes of mid-size cities and large towns ($\geq 25,000$), and (3) rural – comprised of small towns (2,500 – 25,000) and rural areas ($< 2,500$). The following ranges of institution size were used: 1,000 or fewer students, 1,001 – 3,000 students, 3,001 – 10,000 students, and more than 10,000 students.

The frequency distributions for each program area were calculated for those institutions reporting use of industry-based skill standards ($n = 153$). The following parameters were established for reporting data associated with awareness, implementation, assessment, and certification/credentialing.

Parameter 1: Awareness. Awareness of skill standards was based on those institutions reporting offerings in a particular program area. For example, frequency distributions for awareness of manufacturing skill standards were calculated only for those institutions that reporting offering manufacturing programs. This parameter was applied to the remaining 10 program areas.

It was recognized that respondents could have awareness of a particular set of skill standards even though the program was not currently offered at their institution. However, the parameter remained as stated above because the questionnaire was designed to direct respondents to the items associated with the next program area if the current program area under investigation was not offered at their institution. For example, if the institution did not offer a manufacturing program, the questionnaire directed participants to move to the subsequent program area (industrial – non-manufacturing). These guidelines were applied to the remaining sections of the questionnaire by program area.

Parameter 2: Implementation/Implementation Purposes. Overall implementation was based on those institutions that reported an awareness of skill standards (parameter 1) for a particular program area. This parameter assumed that institutions could not be implementing a set of standards for which organizational members had no awareness. The specific ways that an institution was implementing skill standards (purposes) were based on those institutions that reported the implementation of skill standards for a particular program area.

Results

Institutional Participation in Use of Skill Standards

Out of the 202 institutions responding to the survey, a total of 153 (75.7%) reported the use of skill standards within postsecondary CTE curricula while 49 (24.3%) indicated skill standards were not currently being used. The distribution of institutions using skill standards varied by region (East, 65.8%; Midwest, 78.7%; West, 85.2%), locale (urban, 78.7%, suburban or large town, 79.3%; rural, 70.9%), and enrollment (1,000 or fewer students, 81.3%; 1,001-3,000, 68.6%; 3,001 – 10,000, 77.5%; more than 10,000, 84.6%). The percentage of institutions (based on $n = 153$) offering each of the 10 CTE program areas is as follows: business, administrative, and information technology (87%), health occupations (82%), automotive/mechanical (73%), trades/construction (67%), manufacturing (67%), family and consumer science/childcare (59%), graphic arts (50%), industrial (47%), hospitality/hotel management (46%), and agricultural (37%).

Awareness of Skill Standards

For those institutions that offered specific CTE programs, their representatives were requested to identify their level of awareness of the applicable skill standards. Respondents' awareness of applicable skill standards varied across the 10 program areas. For three of the program areas (manufacturing, trades/construction, health occupations), approximately 72% of the respondents indicated they were aware of the applicable skill standards.

For automotive/mechanical, approximately 80% of the respondents were aware of the applicable skill standards for this field while only 30% were aware of the standards for the field of agriculture (30%). Out of the remaining five program areas, the percentage of respondents aware of the applicable skill standards ranged from 38% (graphic arts) to 62% (family and consumer science/childcare).

Implementation of Skill Standards

Respondents were then asked if the applicable industry skill standard or a similar state-level skill standard was being implemented by the community college. The data revealed that health occupations (99.2%) and automotive/mechanical (94.6%) were the two programs areas in which the largest number of institutions were implementing national skill standards or similar state-level standards. For trades/construction, 76.7% of the respondents indicated their institution was implementing standards in this program area with 64.9% of the institutions reporting implementation within the family and consumer science/childcare area. The data revealed that only 16% of the institutions were implementing standards associated with agriculture while 19.8% reported implementation of graphic arts standards. For the remaining program areas, the number of institutions implementing applicable national or state-level skill standards ranged from 33.3% (industrial) to 50.9% (manufacturing).

Approaches to Implementation

The survey was designed to solicit the various ways institutions were implementing skill standards into the various CTE curricula areas. Those respondents who stated through an earlier survey item that their institution was implementing skill standards into a specific program area were offered eight descriptions of implementation from which to select. Respondents were guided to select as many means of implementation as applicable for a particular program area. While respondents reported that the applicable skill standards were being implemented in each of the eight ways listed, particular skills are implemented more extensively by community colleges in comparison to others.

Both automotive/mechanical and health occupations had the highest percentage of institutions implementing skill standards across the eight various ways. For those institutions that implement automotive/mechanical skill standards, approximately 73% of these institutions implement them in each of the eight various ways listed on the survey. Implementation for the purpose of developing curriculum was reported by 81.3% of the institutions while 59.3% of the institutions use these same skill standards for selecting CTE faculty. Roughly 76% use these skill standards for assessing student performance. The numbers look similar for the health occupations skill standards. For those institutions that implement health occupations skill standards, approximately 74% of these institutions implement them in each of the eight various ways. Implementation for the purpose of developing curriculum was reported by 83.3% of the institutions while 64.6% of the institutions use these same skill standards for selecting CTE faculty. The percentage of institutions using the standards for assessment purposes is 81%.

The program areas of graphic arts, agriculture, and business, administrative, and IT had the lowest percentage of institutions implementing applicable skill standards across the eight various ways. Less than one-fourth (23%) of the institutions implement skill standards in each of the eight ways. Specifically, 31% of the institutions reporting implementing skill standards for the purpose of curriculum development and 13.8% of the institutions implement them for the purpose selecting new CTE faculty members. Twenty-four percent (24%) of the institutions report using skill standards for the student assessment. The data reveal a similar pattern for the agricultural program area. On average, 26% of the institutions implement agriculture skill standards for each of the eight purposes listed. 35.3% of these institutions implement agriculture skill standards for the purpose of curriculum development while 17.6% use them for selecting faculty. The data show that 29.4% of the community colleges use these standards for the purpose of student assessment. Finally, for the program area of business, administrative, and IT an average of 30% of the institutions report implementing the applicable skill standards across each of the eight ways. The percentage of institutions implementing the standards for the purpose of curriculum development is 39.5% while the percentage of institutions implementing the standards for the purpose of selecting CTE faculty member is 19.7%. A total of 34.2% of the responding institutions use the skill business, administrative, and IT skill standards for student assessment purposes.

Out of the remaining five CTE program areas, the percentage of community colleges implementing the applicable standards in each of the eight ways was as follows: manufacturing: 35%, industrial: 32%, trades/construction: 51%, family and consumer science/childcare: 44%; hospitality/hotel management: 42%. Across all 10 program areas, the largest percentage of community colleges were implementing standards for the purpose of curriculum development while the smallest percentage of colleges were implementing standards for the purpose of faculty selection.

Conclusions and Discussion

The purpose of this study was to identify the extent to which national industry-based skill standards were being implemented in community college CTE curricula in 10 program areas. It is important to keep in mind that while the survey was designed to focus primarily on national industry-based skill standards, respondents were also asked about similar state-level skill standards. Therefore it is possible that a respondent would not be aware of a national standard but be aware of a state-level standard. With this in mind, the following conclusions can be drawn from this study.

Awareness of National Industry-Based Skill Standards. The awareness level about national industry-based skill standards without a doubt varies across individuals in various CTE programs and community colleges. While respondents had some awareness of the applicable skill standards for a particular program area, this awareness varied. The program areas in which respondents reported the highest level of awareness correspond to those same fields that can have very rigorous credentialing and certification requirements for employment including manufacturing, construction, automotive, and health occupations. Given some of these rigorous credentialing and certification requirements, it is logical that individuals would be more keenly aware of the standards that impact these fields in order to keep program content and coursework up to date. On the other hand, those areas in which awareness of national skill standards was lower, such as graphic arts and agriculture, are also areas of study that do not require rigorous credentialing and certification requirements in order to enter the job market. While this was not part of the study, it is logical that a relationship exists between the level of national skill standards awareness on the part of the respondent and the level of credentialing and certification required in order to secure a job in a particular program area.

Implementation of Skill Standards. Colleges are implementing both national industry-based and similar state-level standards; however, more institutions implement the national standards. It is apparent from the data that the level of implementation of skill standards does vary across the 10 CTE program areas. However, as with the level of awareness, it does appear that the level of implementation of both national- and state-level skill standards has a direct relationship to the type of certification/credentialing requirements for a particular area of work and whether these certification/credentialing requirements must be met in order to enter the job market.

Those program areas in which the highest numbers of community colleges were implementing skill standards included construction (77%), automotive/mechanical (95%), and health occupations (99%). In fact, nearly all of the respondents who reported awareness of the applicable national- and state-level skill standards for these program areas also indicated that their respective institutions were implementing them. As a whole, each of the jobs associated with these three program areas require certification and credentialing requirements to be met prior to job entry. Therefore, offering strong CTE programs that have adequately prepared students to achieve certification/credentialing requirements is to the college's best interest and fits into the mission of the institution.

It is important to keep in mind that these findings do not imply that other CTE program areas lack certification/credentialing requirements. However, these other program areas, as a whole, do not require that certification/credentialing requirements be met prior to entering the workforce. In addition, many of these other areas require certification/credentialing associated with tools and tasks unique to a specific organization; therefore, this certification/credentialing process would occur after an individual begins work.

Finally, it is important to recognize the fact that state-level standards are playing a role within the picture of skill standards implementation in postsecondary CTE programs. As noted earlier, all program areas were implementing a combination of both the national- and state-level standards. While the purpose of the study was not to determine how decisions are made as to which standards do or do not get implemented, the findings suggest that postsecondary CTE programs may have obligations to meet state-level standards in order to adequately prepare students for work.

Approaches to Implementation. Community colleges that are currently implementing either national industry-based or state level skill standards are doing so for all of the eight purposes listed on the survey. The majority of the community colleges are implementing standards for the purpose of developing curriculum. The purpose least selected for implementing skill standards is that of selecting CTE faculty members. From the distribution of the data in each of the 10 program areas, it is clear that those community colleges that implement skill standards allow them to influence many areas of the instructional process including development and student assessment. In addition, skill standards implementation is playing a role in terms of marketing the program to both business/industry and students.

Summary

The purpose of this study was to take a national snapshot of the extent to which skill standards (industry, professional, education and other) have become part of the community college CTE curricula. While this study was purely descriptive in nature, it does bring insight to the field of postsecondary career and technical education by illuminating the current levels of awareness and implementation. While this study does not explain why certain activities are occurring or why particular decisions are being made at the community college, it does provide an opportunity for additional questions to be asked and additional research studies to be implemented. As Gall, Gall, and Borg (2003) state, descriptive research involves making careful descriptions of educational phenomena for the purposes of generating a basis for explanation and change and building the foundation for discovering cause-and-effect through the use of experimental research designs.

The field of career and technical education is constantly changing. New pieces of legislation, the elimination of old ones, and more demands from business and industry to produce a strong workforce will continue to impact the shape which the field will take. This study reveals that community colleges across the nation are responding to these forces by working with business and industry and national organizations to become aware of and integrate standards that will help to ensure job success and mobility for their students.

While this study focused on skill standard implementation within community college curricula, implications for HRE professionals exist as well. Skill standards have become a means for replacing job task analyses as the SKAs needed for successful employment in various career and technical areas have already been identified by business and industry. These standards have enabled content to become standardized across career and technical fields reducing the cost and increasing the accuracy of the training provided. Skill standards have become a way of linking business and industry with postsecondary education to facilitate workforce development.

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